Name:	***Human Behavior in Fire***
Course Description:	This course provides fundamental information on human behavior as it relates to fire and mass casualties. Understanding human behavior is important as it relates to building design, evacuation and fire department operations. It is especially important where populations are large or include the disabled or persons having limited mobility.
Prerequisite:	FESHE core courses or equivalent
Outcomes:	1. Categorize the types of behavior that people exhibit in fire situations as positive or negative as they effect emergency evacuation. 2. Outline three fire scenarios and describe the possible physiological impact each may have on building occupants and responding firefighters. 3. Identify four psychological traits of building occupants which may effect their identification of and response to a fire. 4. Perform algebraic estimates of occupant evacuation times from buildings. 5. Identify the two primary modeling techniques used to estimate evacuation times in large buildings and transportation facilities. 6. Identify at least four occupancies where human behavior and response characteristics are unique to occupancies and where there is a high potential life loss. 7. Write a summary of the human factors effecting high life loss in a major fire incident. 8. Identify five occupancies in your town/city/jurisdiction where human factors and building design may be factors in emergency evacuation. For one of these occupancies, list fire department procedures which should be implemented to deal with a major incident. 9. Develop a fire scenario and provide an estimate of the effective time of operation for the first responding firefighters. 10. Understand aspects of human behavior in mass casualties. 11. Identify and analyze the causes involved in the line of duty firefighter deaths related to structural and wildland firefighting, training and research and the reduction of emergency risks and accidents
Suggested Student Texts:	SFPE Seminar: Human Behavior in Fire

	SFPE Engineering Guide on Human Behavior in Fire SFPE Engineering Guide on Estimating Fire Department Contributions toward Achieving Fire Safety Goals (draft) SFPE SFPE Fire Protection Engineering Magazine, Fall 2005, Issue No. 28 http://www.pentoncustommedia.com/sfpe/articles/Fall2005
Supporting References	**References** Purser, D. "Toxicity Assessment of Combustion Products", Proulx. G. "The Movement of People: The Evacuation Timing" Nelson, H.E., and Mowrer, F.W., "Emergency Movement", *SFPE Handbook of Fire Protection Engineering*, National Fire Protection Association, Quincy, MA, 2002, pp. 2-99 - 2:111 Society of Fire Protection Engineers: http://www.pentoncmg.com/sfpe/index.html http://www.peopleandfire.com/ Bryan, J. L., "Human Behavior and Fire", and Fahy, R.F., "Calculation Methods for Egress Prediction", *Fire Protection Handbook*, National Fire Protection Association, Quincy, MA, 2003, pp. 4-3 - 4-55. Best, R.L., "Reconstruction Of A Tragedy: The Beverly Hills Supper Club Fire", *Southgate, Kentucky, May 28, NFPA, 1977.* Review of 28 Egress Models. Kuligowski, E. D. NIST SP 1032; January 2005. Workshop on Building Occupant Movement During Fire Emergencies. Proceedings. Session 4.4. June 10-11, 2004, Gaithersburg, MD, Peacock, R. D.; Kuligowski, E. D., Editor(s)(s), 68-90 pp, 2005. http://fire.nist.gov/bfrlpubs/fire05/PDF/f05008.pdf http://www.pentoncustommedia.com/sfpe/articles/Fall2005Kuligowski.pdf **U.S. Fire Administration** Publications: http://www.usfa.dhs.gov/applications/publications/pubs_main.cfm See Fire Protection, Fire Administration, Fire Service Operations Applied Research: http://www.usfa.dhs.gov/dhtml/inside-usfa/research.cfm Research Reports: http://www.usfa.dhs.gov/dhtml/inside-usfa/r_reports.cfm Technical Reports: http://www.usfa.dhs.gov/applications/publications/techreps.cfm Topical Fire Research Series: http://www.usfa.dhs.gov/dhtml/inside-usfa/tfrs.cfm

	Learning Resource Center: http://www.usfa.dhs.gov/dhtml/inside-usfa/lrc.cfm **National Institute for Standards and Technology** http://www.fire.nist.gov: Fire Tests/Data, Software/Models, Publications, FIREDOC (under Publications) http://fire.nist.gov/bfrlpubs/fire93/art090.html **Current Events/News** http://www.firehouse.com/ http://www.fireengineering.com/ http://www.withthecommand.com/
Assessment:	Students will be evaluated for mastery of learning objectives by methods of evaluation to be determined by the instructor
NFPA Standards Addressed	1031
Point(s) of Contact:	Joseph L. Scheffey, P.E., Hughes Associates, Inc. 3610 Commerce drive, Suite 816 Baltimore, MD 21227-1652 Joe@haifire.com, www.haifire.com Judith Kuleta, Bellevue Community College WA (425)564-2515 jkuleta@bcc.ctc.edu **Revision 11/05**

Course Outline

Human Behavior

I. General Overview of Human Response to Fire

A. Occupant Response Characteristics
   1. Familiarity with structure
   2. Pre-evacuation behavior

B. Human Response to Cues
   1. Alarms, signs
   2. Preplanning/staff training

C. Decision Making
   1. Panic as a rare occurrence

D. Egress behavior and decision making

II. Impact of Environment on People

A. Thermal

B. Toxicity

C. Visibility

D. Psychological
   1. Perception of smoke and fire

III. Assessment of Occupant Movement in Buildings

A. Evacuation Assessment Fundamentals
   1. Horizontal Flow
   2. Vertical Flow

B. Modeling of Evacuation
   1. Hydraulic
   2. Behavioral

C. Special Occupancies
   1. High Rise
   2. Health Care
      a. Hospital
      b. Board/care
   3. Public Assembly

a. Stadia

b. Arenas

4. Residential

5. Transportation terminals

6. Hazmat occupancies

D. Use of Elevators

IV. Fire Department Operations

A. Evacuation and Rescue

1. Provide information to evacuees

2. Occupant egress vs. fire department ingress

B. Firefighting

1. Heat Stress

2. Exposure to smoke, toxins and hazardous gases

C. Mass Casualties